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lus in a service where no positions of responsibility and direction are open to civil experts, however great their attainments and devotion to the public service."

Some months subsequently, in a letter to the committee of the National academy of sciences, the superintendent added the important considerations that the naval officers detailed by their department for coast-survey duty are almost without exception well pleased with their service in this capacity, although, in reality, more arduous than the regular routine of the naval service in time of peace. They are at all times, however, perfectly under the control of the navy department, and subject to being detached and ordered upon other duty. No officer of the navy above the rank of commander is attached to the survey, and most of the officers are of the grades between ensign and lieutenant. In this survey work they obtain a most valuable experience, which stands them in great stead on foreign stations.

The alleged duplication of work by the coast survey and the hydrographic office of the navy department is often urged as a reason for the transfer of the survey to the navy; but in reality there is no clashing. The special work of the hydrographic office consists in publishing charts of foreign coasts for the use of the navy and our commercial marine, as also of directing surveys on foreign coasts by our naval vessels when their opportunities permit. The functions of the two offices are thus entirely different.

The hydrographic work conducted by the coast survey along our own shores is not a nautical survey, but, properly speaking, a trigonometrical survey, in which the positions of the depths observed, and of rocks and shoals, are determined by the observation of angles upon objects on shore, which are known by the triangulation and topography. The hydrography is closely co-ordinated with these, and cannot be separated from them without losing much of its present excellence.

DAVID P. TODD.

RECENT CHANGES IN CORNELL UNIVERSITY.

THE growth and prosperity of Cornell university are shown in the measures which its trustees are taking to enlarge and strengthen its faculty. The value of a university lies in its teaching force. Cornell university has been put by its benefactors on a firm financial basis, and the trustees are wisely preparing to employ its increased revenue in adding to its facilities for instruction. The most important of these new measures is the re-organization of the Sibley college of mechanical engineering, with Dr. R. H. Thurston as its direc-

tor. Following this are the measures just consummated and announced, providing for other changes in the faculty. Dr. Wilson, the distinguished and venerable professor of moral and intellectual philosophy, and Professor Schackford, the professor of rhetoric and general literature, are retired at the end of the present year with liberal allowances. A professorship of pedagogy has been established; and Prof. S. G. Williams, now occupying the chair of geology, is appointed to the new professorship. As this is a new feature in our New York colleges, the results of the experiment are looked to with great interest. Professor Williams has had an unusual training for such a professorship. As a teacher in preparatory schools, as a superintendent of schools, and a professor in Cornell university, he has enjoyed an experience which will enable him to put himself in sympathy with those who are preparing themselves for teaching, and to give them whatever aid is possible.

The retirement of Professor Williams from the chair of geology enables the trustees to consolidate the now separate departments of geology and paleontology in one, and to promote Prof. H. S. Williams, who has occupied the latter chair, to the professorship of geology and paleontology. Other changes are either made or contemplated which will still further re-enforce the board of instruction. Not the least important of these changes is the increase in the salaries paid to all the principal professors. The inadequate compensation heretofore allowed has cost the university in several instances the loss of men whom it would have been glad to retain. Two of the professors are to receive \$3,200 each; eleven others, \$3,000 each; and in other cases the stipends have been proportionately increased. S.

THE ABBOTT COLLECTION AT THE PEABODY MUSEUM.

THE collection of stone implements made at Trenton, N.J., by Dr. C. C. Abbott, now on exhibition in one of the recently opened rooms of the Peabody museum of archeology at Cambridge, is one of the most important series of the kind ever brought together, and one which archeologists will consult for all time to come. It contains more than twenty thousand stone implements and several hundred associated objects, made of bone, clay, and copper, with several pipes and numerous ornaments and carved stones.

There are several considerations which give the collection exceptional importance. First, it was brought together from a very limited area by a single archeologist; all the specimens having been found by Dr. Abbott upon his own farm and its

immediate vicinity, with the exception of some of the paleolithic implements, and even these were found within an extreme radius of four miles. Second, the gatherings in this limited region have been so long continued and so thorough, that the result is a collection which shows *en masse* the work of the peoples who inhabited the Delaware valley at different periods, in a manner and to an extent never before obtained from any part of this country, and probably not from any other part of the world. Third, the collection is the same which formed the basis of Dr. Abbott's volume on 'Primitive industry,' and has been arranged by Dr. Abbott himself, under the direct supervision of the curator.

As now arranged, the Abbott collection exhibits at one and the same time the sequence of peoples in the valley of the Delaware, from paleolithic man through the intermediate period, to the recent Indians, and the numerical proportion of the many forms of their implements, each in its time. It thus forms an exhibition at once instructive to the general visitor, and of great importance to the serious student. It is indeed doubtful whether any similar collection exists, where a student can gather so much information at sight, as here, where the natural pebbles from the gravel begin the series, and the beautifully chipped points of chert, jasper, and quartz, terminate it in one direction, and the polished celts and grooved stone axes in the other.

The paleolithic implements from the gravel and from the talus include nearly all found, some of them coming from a depth of thirty feet in the gravel; with one exception, a black flint, they are made of a hard, fine-grained argillite; many are but slightly chipped, while others are of well-defined forms, similar to the paleoliths of the old world. With these specimens are the human skull, under jaw, and wisdom-tooth, found at different times in the same gravel as the implements.

Following the paleoliths are the several thousand rude and greatly weathered points and flakes of argillite of various forms. The relative importance of the different sorts to the people who used them is shown in an instructive way by grouping and heaping, so that the eye at once takes cognizance of this, while it detects at the same time the individuality of the makers. These points belong to the middle period of occupation of the valley; never found in the gravel, they are, as a whole, much older than the mere surface specimens and those from graves.

To these latter, the work of the recent Delaware Indians, belong the rude scrapers made by simply splitting a pebble, the rudely chipped agricultural implements of several kinds of stone, and the

chipped scrapers, many of which are beautiful illustrations of this kind of work. These, like the arrow-heads, knives, and large spear-like implements shown in an adjoining case, are made from jasper of different colors, as well as from chert and quartz, and are shown in great variety and number. Of the other forms of implements, also illustrated by many varieties of each, are the hammer-stones, rubbing and polishing stones, pitted stones, mortars and pestles, celts and axes.

The ornamental stones are of various shapes, some of them simply perforated; the so-called gorgets are in various stages of manufacture, and there are several carvings representing human heads. A few pipes cut out of stone illustrate the Delaware type of tobacco pipe, while numerous fragments of pottery show that they were also made of clay. The potsherds exhibit a considerable variety of ornamentation, principally by incised lines, though many are cord-marked, and others have impressed designs. Two spear-heads of hammered native copper and a little group of miscellaneous objects are exhibited separately.

Another group of specimens, not included in the enumeration given above, though by no means an unimportant part of the exhibit, are the chips and refuse material of an Indian workshop. This large mass was sifted from the dirt in a single spot a few feet in diameter, evidently from where some Indian long worked in fashioning various implements. In the mass are thousands of chips of stones of various kinds, broken specimens, failures, hammer-stones, and nodules of jasper brought to the place, but still unwrought.

The collection and its arrangement are invaluable, unique, and of extreme importance to all who wish to study the stone age of our Atlantic coast. It reflects great credit upon the industry and sharp-sightedness of the collector, and exhibits as well the same perspicacity and serious method that is a marked feature of the entire museum. The problem of the exhibition of archaeological objects, so that they may themselves give the most significant and instructive lessons, without reflecting transitory theories, has found an excellent solution at Cambridge.

FIRST LESSONS IN PHILOSOPHY.

PROFESSOR DE MORGAN, in his wonderfully witty 'Budget of paradoxes,' speaking of the dislike of most people to discriminate beyond a certain point, says, that, for the majority, "all such things as distinctions are evasions, subterfuges, come-offs, loop-holes, etc. They would hang a

First lessons in philosophy, being an introduction to metaphysic and logic for beginners. By M. S. HANDLEY. New York, Scribner & Welford, 1883. 16°.